

Carbon Debt Analysis of the Elmridge Golf Solar Project (229 Elm Ridge Rd. & N. Anguilla Rd, Stonington, CT)

Greenskies Clean Energy provided services performed a carbon debt analysis for the Elmridge Golf proposed solar installation (the Project). The purpose of this analysis was to determine whether the Project can have a net improvement in carbon reduction compared to the loss of 1.48 acres of trees. The proposed Project areas amount to approximately 15 acres and the Project will require removing 1.48 acres of trees on the East Project parcel for shade minimization, representing 9.8% of the total Project area and 1.7% of the East Project area parcel (87.57 ac).

The analysis relied upon a US Environmental Protection Agency (US EPA) conversion factor to identify the amount of carbon sequestered in one year by one acre of average U.S. forest: 0.85 metric tons (MT) CO₂ (US EPA, 2018). As the Project requires the removal of approximately 1.48 acres of trees, the associated “carbon debt” is estimated to be 1.26 MT CO₂ per year. Over 20 years, this would equate to the sequestration of 25.2 +/- MT CO₂.

The Project is expected to produce approximately 4,953,277 kWh of energy in its first year of operation. Using the US EPA Greenhouse Gas Equivalencies Calculator, the estimated annual carbon offset of the Project is 3,502 MT CO₂.

Attachment A provides greenhouse gas equivalencies for this estimated offset, examples of which include:

- 757 passenger vehicles driven for one year;
- 593 homes’ electricity use or 404 homes’ energy use for one year or ;
- 3,858,905 pounds of coal burned.

Anticipating an annual “carbon debt” of 1.26 MT CO₂ and an annual carbon offset of 3,502 MT CO₂, Greenskies Clean Energy performed the following calculation to determine the duration of time to offset the carbon debt of the tree clearing:

Offset Time in days= Annual Carbon Debt/(Annual MT CO₂ Offset/days per year)

Using this formula, Greenskies Renewable Energy has determined that it would take approximately 0.13 days to produce a net improvement in carbon reduction. It would take approximately 2.6 days to recover the loss of carbon sequestration by the 1.48 acres of cleared trees over 20 years.

This analysis does not account for energy used as part of upstream activities including material extraction; solar panel manufacturing and production; manufacturing of balance of system components or project installation, including the act of land clearing.

References

U.S. Environmental Protection Agency (US EPA). (2018). Greenhouse Gases Equivalencies Calculator - Calculations and References. Retrieved July 19th 2019, from <https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references>